



**GOVERNMENT POLYTECHNIC, KENDRAPARA, DEPARTMENT OF HUMANITIES AND SCIENCE**

Discipline:	Semester: 2 <sup>ND</sup> , <b>COMMON</b>	Name of the Teaching Faculty: <b>Saktiman Bariki(GF, Mathematics)</b> <b>Subhasree Swain(GF, Mathematics)</b>	
Subject: <b>Mathematics-II</b>	No. of days/per week class allotted: <b>04</b>	Semester From date: <b>09.01.2026</b> to Date: <b>08.05.2026</b> No. of Weeks: <b>15</b>	
<b>PRE-REQUISITES</b>	Basic knowledge of Mathematics.		
<b>COURSE OUTCOMES</b>	<b>CO1</b>	Apply the concept of Determinants and Matrices on 3rd order system of equations to find the unknown parameters and simple programming using MATLAB..	
	<b>CO2</b>	Apply Integral calculus to obtain area and volume of solid.	
	<b>CO3</b>	Connect algebra and geometry through graphs of lines and curves.	
	<b>CO4</b>	Differentiate between a resultant and a concurrent force through vector algebra.	
	<b>CO5</b>	To model simple physical problems in the form of a differential equation, analyze and interpret its solutions..	
<b>Week</b>	<b>Class Days</b>	<b>Theory/Practical Topics</b>	<b>No of periods allotted</b>
<b>1ST</b>	<b>1st</b>	<b>UNIT - I: Determinants and Matrices</b>	<b>1</b>
	<b>2nd</b>	<b>Elementary properties of determinants up to 3rd order,</b>	<b>1</b>
	<b>3rd</b>	<b>consistency of equations,</b>	<b>1</b>
	<b>4th</b>	<b>Cramer's rule.</b>	<b>1</b>
<b>2nd</b>	<b>1st</b>	<b>Algebra of matrices,</b>	<b>1</b>
	<b>2nd</b>	<b>nverse of a matrix,</b>	<b>1</b>
	<b>3rd</b>	<b>matrix inverse method to solve a system of linear equations in 3 variables.</b>	<b>1</b>
	<b>4th</b>	<b>Exercise</b>	<b>1</b>
<b>3rd</b>	<b>1st</b>	<b>UNIT - II: Integral Calculus Integration as inverse operation of differentiation</b>	<b>1</b>
	<b>2nd</b>	<b>Simple integration by substitution</b>	<b>1</b>
	<b>3rd</b>	<b>by parts and by partial fractions (for linear factors only).</b>	<b>1</b>

	4th	Use of formulas $\int_0^{\frac{\pi}{2}} \sin^n x dx$ , $\int_0^{\frac{\pi}{2}} \cos^n x dx$ and for solving problems	1
4th	1st	Applications of integration for i.	1
	2nd	Simple problem on evaluation of area bounded by a curve and axes.	1
	3rd	. Calculation of Volume of a solid formed by revolution of an area about axes. (Simple problems)	1
	4th	exercise	1
5th	1st	UNIT - III: Co-Ordinate Geometry Equation of straight line in various standard forms (without proof),	1
	2nd	inter section of two straight lines, angle between two lines	1
	3rd	Parallel and perpendicular lines, perpendicular distance formula.	1
	4th	General equation of a circle and its characteristics.	1
6th	1st	To find the equation of a circle, given: Centre and radius,	1
	2nd	Three points lying on it and	1
	3rd	Coordinates of end points of a diameter;	1
	4th	Definition of conics (Parabola, Ellipse, Hyperbola) their standard equations without proof. Problems	1
7th	1st	on conics when their foci, directories or vertices are given.	1
	2nd	Exercise	1
	3rd	UNIT -IV: Vector Algebra Definition notation and rectangular resolution of a vector	1
	4th	Addition and subtraction of vectors. Scalar	1
8th	1st	vector products of 2 vectors	1
	2nd	Simple problems related to work, moment and angular velocity	1
	3rd	Exercise	1
	4th	UNIT-V: Differential Equations Solution of first order and first degree differential equation	1

9th	1st	degree differential equation by variable separation method (simple problems)	1
	2nd	. MATLAB – Simple Introduction.	1
	3rd	Exercise	1
	4th	Revision	1
10th	1st	Revision	1
	2nd	Revision	1
	3rd	Revision	1
	4th	Revision	1
11th	1st	Revision	1
	2nd	Revision	1
	3rd	Revision	1
	4th	Revision	1
12th	1st	Revision	1
	2nd	Revision	1
	3rd	Revision	1
	4th	Revision	1
13th	1st	Revision	1
	2nd	Revision	1
	3rd	Revision	1
	4th	Revision	1
14th	1st	Revision	1
	2nd	Revision	1
	3rd	Revision	1
	4th	Revision	1
15th	1st	Revision	1
	2nd	Revision	1
	3rd	Revision	1
	4th	Revision	1

**BOOK REFERENCE:**

1.B.S GREWAL, HIGHER ENGINEERING MATHEMATICS, KHANNA PUBLISHER, NEW DELHI,40TH EDITION

2.G.B. THOMAS,R.L. FINNEY, CALCULUS & ANALYTIC GEOMETRY, ADDISON WESLEY, 9TH EDITION

Subhasree Swain, 08.01.26  
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